

## ANALYTICAL REPORT

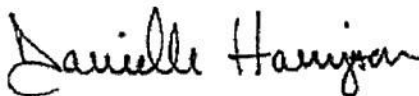
Job Number: 280-114793-1

Job Description: ADEM PFC Sampling - Gadsden

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
Danielle M. Harrington  
Project Manager II  
10/5/2018 8:51 AM

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Designee for  
DiLea R Bindel, Project Manager I  
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10/05/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

TestAmerica Laboratories, Inc.

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-114793-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Gadsden**

**Report Number: 280-114793-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 09/26/2018; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.8 C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Samples GADSDEN-RAW (280-114793-1) and GADSDEN-FINISHED (280-114793-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 09/27/2018 and analyzed on 09/29/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: GADSDEN-RAW (280-114793-1) and GADSDEN-FINISHED (280-114793-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

The opening continuing calibration verification (CCV) was high for 13C8 PFOS. The samples were in control and the closing CCV was in control, therefore, corrective action is deemed unnecessary.

Perfluorohexanoic acid (PFHxA) was detected in method blank MB 280-431186/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-114793-1

Client Sample ID: GADSDEN-RAW

Lab Sample ID: 280-114793-1

Date Collected: 09/24/18 21:38

Matrix: Water

Date Received: 09/26/18 09:15

## Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.018		0.016	0.0081	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorodecanoic acid (PFDA)	0.0065	U	0.016	0.0065	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorododecanoic acid (PFDoA)	0.012	U	0.025	0.012	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluoroheptanoic acid (PFHpA)	0.015	J	0.025	0.011	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorohexanoic acid (PFHxA)	0.036	B	0.016	0.0024	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorononanoic acid (PFNA)	0.014	U	0.033	0.014	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorooctanoic acid (PFOA)	0.031		0.016	0.0081	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorooctane Sulfonate (PFOS)	0.049		0.025	0.011	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluoropentanoic acid (PFPA)	0.059		0.025	0.0090	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.025	0.012	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorotridecanoic Acid (PFTriA)	0.015	U	0.033	0.015	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluoroundecanoic acid (PFUnA)	0.0057	U	0.016	0.0057	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorobutanesulfonic acid (PFBS)	0.10		0.016	0.0068	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorodecanesulfonic acid (PFDS)	0.0075	U	0.016	0.0075	ug/L		09/27/18 08:52	09/29/18 00:19	1
Perfluorohexanesulfonic acid (PFHxS)	0.0057	U	0.025	0.0057	ug/L		09/27/18 08:52	09/29/18 00:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	88		60 - 155				09/27/18 08:52	09/29/18 00:19	1
13C8 PFOS	96		45 - 130				09/27/18 08:52	09/29/18 00:19	1

Client Sample ID: GADSDEN-FINISHED

Lab Sample ID: 280-114793-2

Date Collected: 09/25/18 12:00

Matrix: Water

Date Received: 09/26/18 09:15

## Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.016	J	0.017	0.0083	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorodecanoic acid (PFDA)	0.0066	U	0.017	0.0066	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.025	0.013	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluoroheptanoic acid (PFHpA)	0.012	J	0.025	0.011	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorohexanoic acid (PFHxA)	0.033	B	0.017	0.0025	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorononanoic acid (PFNA)	0.015	U	0.034	0.015	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorooctanoic acid (PFOA)	0.027		0.017	0.0082	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorooctane Sulfonate (PFOS)	0.037		0.025	0.011	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluoropentanoic acid (PFPA)	0.056		0.025	0.0092	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.025	0.012	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorotridecanoic Acid (PFTriA)	0.015	U	0.034	0.015	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluoroundecanoic acid (PFUnA)	0.0058	U	0.017	0.0058	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorobutanesulfonic acid (PFBS)	0.096		0.017	0.0069	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorodecanesulfonic acid (PFDS)	0.0077	U	0.017	0.0077	ug/L		09/27/18 08:52	09/29/18 00:07	1
Perfluorohexanesulfonic acid (PFHxS)	0.0059	U	0.025	0.0059	ug/L		09/27/18 08:52	09/29/18 00:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	87		60 - 155				09/27/18 08:52	09/29/18 00:07	1
13C8 PFOS	97		45 - 130				09/27/18 08:52	09/29/18 00:07	1

TestAmerica Denver



## ANALYTICAL REPORT


Job Number: 280-115063-1

Job Description: ADEM PFC Sampling - Gadsden

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
DiLea R Bindel  
Project Manager I  
10/12/2018 3:02 PM

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DiLea R Bindel, Project Manager I  
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dilea.bindel@testamericainc.com  
10/12/2018

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-115063-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Gadsden**

**Report Number: 280-115063-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 10/3/2018 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Samples Gadsden - Raw (280-115063-1) and Gadsden - Finished (280-115063-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/05/2018 and analyzed on 10/08/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: Gadsden - Raw (280-115063-1), Gadsden - Finished (280-115063-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-115063-1

Client Sample ID: Gadsden - Raw

Lab Sample ID: 280-115063-1

Date Collected: 10/01/18 20:32

Matrix: Water

Date Received: 10/03/18 09:15

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.020		0.016	0.0079	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorodecanoic acid (PFDA)	0.0063	U	0.016	0.0063	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorododecanoic acid (PFDoA)	0.012	U	0.024	0.012	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluoroheptanoic acid (PFHpA)	0.015	J	0.024	0.011	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorohexanoic acid (PFHxA)	0.041		0.016	0.0024	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorononanoic acid (PFNA)	0.014	U	0.032	0.014	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorooctanoic acid (PFOA)	0.028		0.016	0.0079	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorooctane sulfonate (PFOS)	0.041		0.024	0.011	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluoropentanoic acid (PFPA)	0.077		0.024	0.0088	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.024	0.012	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorotridecanoic acid (PFTriA)	0.014	U	0.032	0.014	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluoroundecanoic acid (PFUnA)	0.0056	U	0.016	0.0056	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorobutanesulfonic acid (PFBS)	0.12		0.016	0.0067	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorodecanesulfonic acid (PFDS)	0.0074	U	0.016	0.0074	ug/L		10/05/18 18:59	10/08/18 16:29	1
Perfluorohexanesulfonic acid (PFHxS)	0.0056	U	0.024	0.0056	ug/L		10/05/18 18:59	10/08/18 16:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	86		60 - 155				10/05/18 18:59	10/08/18 16:29	1
13C8 PFOS	99		45 - 130				10/05/18 18:59	10/08/18 16:29	1

Client Sample ID: Gadsden - Finished

Lab Sample ID: 280-115063-2

Date Collected: 10/02/18 12:00

Matrix: Water

Date Received: 10/03/18 09:15

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.022		0.018	0.0087	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorodecanoic acid (PFDA)	0.0070	U	0.018	0.0070	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluoroheptanoic acid (PFHpA)	0.013	J	0.027	0.012	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorohexanoic acid (PFHxA)	0.038		0.018	0.0026	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorooctanoic acid (PFOA)	0.024		0.018	0.0087	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorooctane sulfonate (PFOS)	0.053		0.027	0.012	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluoropentanoic acid (PFPA)	0.077		0.027	0.0097	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.036	0.016	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluoroundecanoic acid (PFUnA)	0.0061	U	0.018	0.0061	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorobutanesulfonic acid (PFBS)	0.12		0.018	0.0073	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorodecanesulfonic acid (PFDS)	0.0082	U	0.018	0.0082	ug/L		10/05/18 18:59	10/08/18 16:42	1
Perfluorohexanesulfonic acid (PFHxS)	0.0062	U	0.027	0.0062	ug/L		10/05/18 18:59	10/08/18 16:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	83		60 - 155				10/05/18 18:59	10/08/18 16:42	1
13C8 PFOS	98		45 - 130				10/05/18 18:59	10/08/18 16:42	1

TestAmerica Denver

## ANALYTICAL REPORT

Job Number: 280-115506-1

Job Description: ADEM PFC Sampling - Gadsden

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
DiLea R Bindel  
Project Manager I  
11/5/2018 7:31 AM

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DiLea R Bindel, Project Manager I  
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dilea.bindel@testamericainc.com  
11/05/2018

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-115506-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
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%R	Percent Recovery
CFL	Contains Free Liquid
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DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling - Gadsden

Report Number: 280-115506-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 10/12/2018 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.6° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Samples GADSDEN-RAW (280-115506-1) and GADSDEN-FINISHED (280-115506-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/20/2018 and analyzed on 11/01/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: GADSDEN-RAW (280-115506-1). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-115506-1

**Client Sample ID: GADSDEN-RAW**

**Lab Sample ID: 280-115506-1**

Date Collected: 10/10/18 20:57

Matrix: Water

Date Received: 10/12/18 10:15

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.031		0.018	0.0087	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorodecanoic acid (PFDA)	0.0069	U	0.018	0.0069	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluoroheptanoic acid (PFHpA)	0.017	J	0.027	0.012	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorohexanoic acid (PFHxA)	0.052		0.018	0.0026	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorononanoic acid (PFNA)	0.015	U	0.036	0.015	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorooctanoic acid (PFOA)	0.040		0.018	0.0087	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorooctane sulfonate (PFOS)	0.071		0.027	0.012	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluoropentanoic acid (PFPA)	0.088		0.027	0.0097	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.036	0.016	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluoroundecanoic acid (PFUnA)	0.0061	U	0.018	0.0061	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorobutanesulfonic acid (PFBS)	0.19		0.018	0.0073	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorodecanesulfonic acid (PFDS)	0.0081	U	0.018	0.0081	ug/L		10/20/18 14:28	11/01/18 00:38	1
Perfluorohexanesulfonic acid (PFHxS)	0.0062	U	0.027	0.0062	ug/L		10/20/18 14:28	11/01/18 00:38	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	103		60 - 155				10/20/18 14:28	11/01/18 00:38	1
13C8 PFOS	104		45 - 130				10/20/18 14:28	11/01/18 00:38	1

**Client Sample ID: GADSDEN-FINISHED**

**Lab Sample ID: 280-115506-2**

Date Collected: 10/11/18 12:00

Matrix: Water

Date Received: 10/12/18 10:15

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.032		0.019	0.0091	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorodecanoic acid (PFDA)	0.0073	U	0.019	0.0073	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.028	0.014	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluoroheptanoic acid (PFHpA)	0.017	J	0.028	0.012	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorohexanoic acid (PFHxA)	0.055		0.019	0.0027	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorononanoic acid (PFNA)	0.016	U	0.037	0.016	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorooctanoic acid (PFOA)	0.037		0.019	0.0091	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorooctane sulfonate (PFOS)	0.055		0.028	0.012	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluoropentanoic acid (PFPA)	0.089		0.028	0.010	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorotetradecanoic acid (PFTeA)	0.014	U	0.028	0.014	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.037	0.016	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluoroundecanoic acid (PFUnA)	0.0064	U	0.019	0.0064	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorobutanesulfonic acid (PFBS)	0.17		0.019	0.0077	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorodecanesulfonic acid (PFDS)	0.0085	U	0.019	0.0085	ug/L		10/20/18 14:28	11/01/18 00:50	1
Perfluorohexanesulfonic acid (PFHxS)	0.0065	U	0.028	0.0065	ug/L		10/20/18 14:28	11/01/18 00:50	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	103		60 - 155				10/20/18 14:28	11/01/18 00:50	1
13C8 PFOS	105		45 - 130				10/20/18 14:28	11/01/18 00:50	1

TestAmerica Denver

## ANALYTICAL REPORT


Job Number: 280-115651-1

Job Description: ADEM PFC Sampling - Gadsden

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release  
DiLea R. Bindel  
Project Manager I  
11/5/2018 7:34 AM

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DiLea R Bindel, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0173  
dilea.bindel@testamericainc.com  
11/05/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)



## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-115651-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Gadsden**

**Report Number: 280-115651-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 10/17/2018 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Samples GADSDEN-RAW (280-115651-1) and GADSDEN-FINISHED (280-115651-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/18/2018 and analyzed on 10/31/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: GADSDEN-RAW (280-115651-1) and GADSDEN-FINISHED (280-115651-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-115651-1

**Client Sample ID: GADSDEN-RAW**

**Lab Sample ID: 280-115651-1**

Date Collected: 10/15/18 21:38

Matrix: Water

Date Received: 10/17/18 09:40

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.036		0.018	0.0086	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorodecanoic acid (PFDA)	0.0074	J	0.018	0.0069	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.026	0.013	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluoroheptanoic acid (PFHpA)	0.020	J	0.026	0.012	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorohexanoic acid (PFHxA)	0.064		0.018	0.0026	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorononanoic acid (PFNA)	0.015	U	0.035	0.015	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorooctanoic acid (PFOA)	0.045		0.018	0.0086	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorooctane sulfonate (PFOS)	0.073		0.026	0.012	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluoropentanoic acid (PFPA)	0.11		0.026	0.0096	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.026	0.013	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.035	0.016	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluoroundecanoic acid (PFUnA)	0.0061	U	0.018	0.0061	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorobutanesulfonic acid (PFBS)	0.22		0.018	0.0073	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorodecanesulfonic acid (PFDS)	0.0081	U	0.018	0.0081	ug/L		10/18/18 17:27	10/31/18 22:35	1
Perfluorohexanesulfonic acid (PFHxS)	0.0061	J	0.026	0.0061	ug/L		10/18/18 17:27	10/31/18 22:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	101		60 - 155				10/18/18 17:27	10/31/18 22:35	1
13C8 PFOS	106		45 - 130				10/18/18 17:27	10/31/18 22:35	1

**Client Sample ID: GADSDEN-FINISHED**

**Lab Sample ID: 280-115651-2**

Date Collected: 10/16/18 12:00

Matrix: Water

Date Received: 10/17/18 09:40

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.039		0.018	0.0089	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorodecanoic acid (PFDA)	0.0071	U	0.018	0.0071	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.027	0.014	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluoroheptanoic acid (PFHpA)	0.019	J	0.027	0.012	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorohexanoic acid (PFHxA)	0.062		0.018	0.0027	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorooctanoic acid (PFOA)	0.040		0.018	0.0089	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorooctane sulfonate (PFOS)	0.059		0.027	0.012	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluoropentanoic acid (PFPA)	0.11		0.027	0.0099	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.036	0.016	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluoroundecanoic acid (PFUnA)	0.0063	U	0.018	0.0063	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorobutanesulfonic acid (PFBS)	0.22		0.018	0.0075	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorodecanesulfonic acid (PFDS)	0.0083	U	0.018	0.0083	ug/L		10/18/18 17:27	10/31/18 22:48	1
Perfluorohexanesulfonic acid (PFHxS)	0.0064	U	0.027	0.0064	ug/L		10/18/18 17:27	10/31/18 22:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		60 - 155				10/18/18 17:27	10/31/18 22:48	1
13C8 PFOS	99		45 - 130				10/18/18 17:27	10/31/18 22:48	1

TestAmerica Denver



## ANALYTICAL REPORT

Job Number: 280-115994-1

Job Description: ADEM PFC Sampling - Gadsden

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
DiLea R Bindel  
Project Manager I  
11/5/2018 7:37 AM

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DiLea R Bindel, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0173  
dilea.bindel@testamericainc.com  
11/05/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-115994-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Gadsden**

**Report Number: 280-115994-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 10/24/2018 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.6° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Samples Gadsden-Raw (280-115994-1) and Gadsden-Finished (280-115994-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/26/2018 and analyzed on 10/31/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: Gadsden-Raw (280-115994-1). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-115994-1

**Client Sample ID: Gadsden-Raw**

**Lab Sample ID: 280-115994-1**

Date Collected: 10/22/18 20:11

Matrix: Water

Date Received: 10/24/18 09:45

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.034		0.017	0.0082	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorodecanoic acid (PFDA)	0.0068	J	0.017	0.0066	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorododecanoic acid (PFDoA)	0.012	U	0.025	0.012	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluoroheptanoic acid (PFHpA)	0.017	J	0.025	0.011	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorohexanoic acid (PFHxA)	0.060		0.017	0.0024	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorononanoic acid (PFNA)	0.015	U	0.034	0.015	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorooctanoic acid (PFOA)	0.043		0.017	0.0082	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorooctane sulfonate (PFOS)	0.076		0.025	0.011	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluoropentanoic acid (PFPA)	0.095		0.025	0.0091	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.025	0.012	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.034	0.015	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluoroundecanoic acid (PFUnA)	0.0058	U	0.017	0.0058	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorobutanesulfonic acid (PFBS)	0.21		0.017	0.0069	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorodecanesulfonic acid (PFDS)	0.0077	U	0.017	0.0077	ug/L		10/26/18 17:16	10/31/18 18:17	1
Perfluorohexanesulfonic acid (PFHxS)	0.0058	U	0.025	0.0058	ug/L		10/26/18 17:16	10/31/18 18:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		60 - 155				10/26/18 17:16	10/31/18 18:17	1
13C8 PFOS	107		45 - 130				10/26/18 17:16	10/31/18 18:17	1

**Client Sample ID: Gadsden-Finished**

**Lab Sample ID: 280-115994-2**

Date Collected: 10/23/18 12:00

Matrix: Water

Date Received: 10/24/18 09:45

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.033		0.018	0.0089	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorodecanoic acid (PFDA)	0.0071	U	0.018	0.0071	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.027	0.014	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluoroheptanoic acid (PFHpA)	0.018	J	0.027	0.012	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorohexanoic acid (PFHxA)	0.055		0.018	0.0027	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorooctanoic acid (PFOA)	0.035		0.018	0.0089	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorooctane sulfonate (PFOS)	0.057		0.027	0.012	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluoropentanoic acid (PFPA)	0.090		0.027	0.0099	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.036	0.016	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluoroundecanoic acid (PFUnA)	0.0063	U	0.018	0.0063	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorobutanesulfonic acid (PFBS)	0.19		0.018	0.0075	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorodecanesulfonic acid (PFDS)	0.0083	U	0.018	0.0083	ug/L		10/26/18 17:16	10/31/18 18:30	1
Perfluorohexanesulfonic acid (PFHxS)	0.0063	U	0.027	0.0063	ug/L		10/26/18 17:16	10/31/18 18:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		60 - 155				10/26/18 17:16	10/31/18 18:30	1
13C8 PFOS	103		45 - 130				10/26/18 17:16	10/31/18 18:30	1

TestAmerica Denver



## ANALYTICAL REPORT

Job Number: 280-116563-1

Job Description: ADEM PFC Sampling - Gadsden

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
DiLea R Bindel  
Project Manager I  
11/15/2018 3:34 PM

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DiLea R Bindel, Project Manager I  
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11/15/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-116563-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Gadsden**

**Report Number: 280-116563-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 11/3/2018 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Samples GADSDEN-RAW (280-116563-1) and GADSDEN-FINISHED (280-116563-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 11/07/2018 and analyzed on 11/08/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: GADSDEN-RAW (280-116563-1) and GADSDEN-FINISHED (280-116563-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-116563-1

Client Sample ID: GADSDEN-RAW

Lab Sample ID: 280-116563-1

Date Collected: 10/31/18 21:15

Matrix: Water

Date Received: 11/03/18 09:00

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.028		0.018	0.0087	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorodecanoic acid (PFDA)	0.0069	U	0.018	0.0069	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.026	0.013	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluoroheptanoic acid (PFHpA)	0.018	J	0.026	0.012	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorohexanoic acid (PFHxA)	0.053		0.018	0.0026	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorononanoic acid (PFNA)	0.015	U	0.035	0.015	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorooctanoic acid (PFOA)	0.035		0.018	0.0086	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorooctane sulfonate (PFOS)	0.072		0.026	0.012	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluoropentanoic acid (PFPA)	0.094		0.026	0.0096	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.026	0.013	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.035	0.016	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluoroundecanoic acid (PFUnA)	0.0061	U	0.018	0.0061	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorobutanesulfonic acid (PFBS)	0.22		0.018	0.0073	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorodecanesulfonic acid (PFDS)	0.0081	U	0.018	0.0081	ug/L		11/07/18 12:23	11/08/18 16:35	1
Perfluorohexanesulfonic acid (PFHxS)	0.0062	U	0.026	0.0062	ug/L		11/07/18 12:23	11/08/18 16:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	101		60 - 155				11/07/18 12:23	11/08/18 16:35	1
13C8 PFOS	111		45 - 130				11/07/18 12:23	11/08/18 16:35	1

Client Sample ID: GADSDEN-FINISHED

Lab Sample ID: 280-116563-2

Date Collected: 11/01/18 12:00

Matrix: Water

Date Received: 11/03/18 09:00

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.026		0.018	0.0088	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorodecanoic acid (PFDA)	0.0070	U	0.018	0.0070	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluoroheptanoic acid (PFHpA)	0.016	J	0.027	0.012	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorohexanoic acid (PFHxA)	0.052		0.018	0.0026	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorooctanoic acid (PFOA)	0.036		0.018	0.0088	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorooctane sulfonate (PFOS)	0.051		0.027	0.012	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluoropentanoic acid (PFPA)	0.087		0.027	0.0098	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.036	0.016	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluoroundecanoic acid (PFUnA)	0.0062	U	0.018	0.0062	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorobutanesulfonic acid (PFBS)	0.20		0.018	0.0074	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorodecanesulfonic acid (PFDS)	0.0082	U	0.018	0.0082	ug/L		11/07/18 12:23	11/08/18 16:48	1
Perfluorohexanesulfonic acid (PFHxS)	0.0063	U	0.027	0.0063	ug/L		11/07/18 12:23	11/08/18 16:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		60 - 155				11/07/18 12:23	11/08/18 16:48	1
13C8 PFOS	109		45 - 130				11/07/18 12:23	11/08/18 16:48	1

TestAmerica Denver



## ANALYTICAL REPORT

Job Number: 280-116687-1

Job Description: ADEM PFC Sampling - Gadsden

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release.  
DiLea R Bindel  
Project Manager I  
11/15/2018 3:40 PM

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11/15/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-116687-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling - Gadsden

Report Number: 280-116687-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 11/7/2018 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Samples GADSDEN-RAW (280-116687-1) and GADSDEN-FINISHED (280-116687-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 11/10/2018 and analyzed on 11/14/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: GADSDEN-RAW (280-116687-1) and GADSDEN-FINISHED (280-116687-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

TestAmerica Job ID: 280-116687-1

Client Sample ID: GADSDEN-RAW

Lab Sample ID: 280-116687-1

Date Collected: 11/05/18 20:17

Matrix: Water

Date Received: 11/07/18 09:00

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.027		0.017	0.0081	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorodecanoic acid (PFDA)	0.0065	U	0.017	0.0065	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorododecanoic acid (PFDoA)	0.012	U	0.025	0.012	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluoroheptanoic acid (PFHpA)	0.019	J	0.025	0.011	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorohexanoic acid (PFHxA)	0.051		0.017	0.0024	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorononanoic acid (PFNA)	0.014	U	0.033	0.014	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorooctanoic acid (PFOA)	0.041		0.017	0.0081	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorooctane sulfonate (PFOS)	0.070		0.025	0.011	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluoropentanoic acid (PFPA)	0.086		0.025	0.0090	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.025	0.012	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.033	0.015	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluoroundecanoic acid (PFUnA)	0.0057	U	0.017	0.0057	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorobutanesulfonic acid (PFBS)	0.23		0.017	0.0068	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorodecanesulfonic acid (PFDS)	0.0076	U	0.017	0.0076	ug/L		11/10/18 13:32	11/14/18 12:47	1
Perfluorohexanesulfonic acid (PFHxS)	0.0058	U	0.025	0.0058	ug/L		11/10/18 13:32	11/14/18 12:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		60 - 155				11/10/18 13:32	11/14/18 12:47	1
13C8 PFOS	110		45 - 130				11/10/18 13:32	11/14/18 12:47	1

Client Sample ID: GADSDEN-FINISHED

Lab Sample ID: 280-116687-2

Date Collected: 11/06/18 12:00

Matrix: Water

Date Received: 11/07/18 09:00

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.027		0.018	0.0086	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorodecanoic acid (PFDA)	0.0068	U	0.018	0.0068	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.026	0.013	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluoroheptanoic acid (PFHpA)	0.015	J	0.026	0.012	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorohexanoic acid (PFHxA)	0.049		0.018	0.0025	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorononanoic acid (PFNA)	0.015	U	0.035	0.015	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorooctanoic acid (PFOA)	0.036		0.018	0.0086	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorooctane sulfonate (PFOS)	0.060		0.026	0.012	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluoropentanoic acid (PFPA)	0.080		0.026	0.0095	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.026	0.013	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.035	0.015	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluoroundecanoic acid (PFUnA)	0.0060	U	0.018	0.0060	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorobutanesulfonic acid (PFBS)	0.21		0.018	0.0072	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorodecanesulfonic acid (PFDS)	0.0080	U	0.018	0.0080	ug/L		11/10/18 13:32	11/14/18 12:59	1
Perfluorohexanesulfonic acid (PFHxS)	0.0061	U	0.026	0.0061	ug/L		11/10/18 13:32	11/14/18 12:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		60 - 155				11/10/18 13:32	11/14/18 12:59	1
13C8 PFOS	111		45 - 130				11/10/18 13:32	11/14/18 12:59	1

TestAmerica Denver



## ANALYTICAL REPORT

Job Number: 280-109004-1

Job Description: ADEM PFC Sampling - Coosa Valley

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release.  
Stephanie K Rothmeyer  
Project Manager I  
5/14/2018 3:51 PM

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Stephanie K Rothmeyer, Project Manager I  
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stephanie.rothmeyer@testamericainc.com  
05/14/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAP, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-109004-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling - Coosa Valley

Report Number: 280-109004-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The sample was received on 4/26/2018 at 9:15 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4° C.

### PERFLUORINATED HYDROCARBONS (PFC)

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Sample COOSA VALLEY-FINISHED (280-109004-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 05/05/2018 and analyzed on 05/10/2018.

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No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-109004-1

**Client Sample ID: COOSA VALLEY-FINISHED**

**Lab Sample ID: 280-109004-1**

Date Collected: 04/23/18 11:40

Matrix: Water

Date Received: 04/26/18 09:15

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.051		0.019	0.0079	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorobutanoic acid (PFBA)	0.0094	U	0.019	0.0094	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorodecane sulfonate (PFDS)	0.0088	U	0.019	0.0088	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorodecanoic acid (PFDA)	0.0075	U	0.019	0.0075	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.029	0.014	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluoroheptanoic acid (PFHpA)	0.013	U	0.029	0.013	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorohexane Sulfonate (PFHxS)	0.0067	U	0.029	0.0067	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorohexanoic acid (PFHxA)	0.017	J	0.019	0.0028	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorononanoic acid (PFNA)	0.017	U	0.038	0.017	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorooctanoic acid (PFOA)	0.017	J	0.019	0.0094	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorooctane Sulfonate (PFOS)	0.019	J	0.029	0.013	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluoropentanoic acid (PFPA)	0.025	J	0.029	0.010	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorotetradecanoic acid (PFTeA)	0.014	U	0.029	0.014	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluorotridecanoic Acid (PFTrIA)	0.017	U	0.038	0.017	ug/L		05/05/18 12:12	05/10/18 19:11	1
Perfluoroundecanoic acid (PFUnA)	0.0066	U	0.019	0.0066	ug/L		05/05/18 12:12	05/10/18 19:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	110		60 - 155	05/05/18 12:12	05/10/18 19:11	1
13C8 PFOS	90		45 - 130	05/05/18 12:12	05/10/18 19:11	1



## ANALYTICAL REPORT

Job Number: 280-114022-1

Job Description: ADEM PFC Sampling - Coosa Valley

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
Stephanie K Rothmeyer  
Project Manager I  
9/12/2018 11:44 AM

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Stephanie K Rothmeyer, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0182  
stephanie.rothmeyer@testamericainc.com  
09/12/2018

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-114022-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Coosa Valley**

**Report Number: 280-114022-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The sample was received on 9/6/2018 at 9:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.6° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample COOSA VALLEY WTP-FINISHED (280-114022-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 09/08/2018 and analyzed on 09/10/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: COOSA VALLEY WTP-FINISHED (280-114022-1), (LCS 280-428995/2-A), (LCSD 280-428995/3-A), (MB 280-428995/1-A). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-114022-1

Client Sample ID: COOSA VALLEY WTP-FINISHED

Lab Sample ID: 280-114022-1

Date Collected: 09/04/18 11:30

Matrix: Water

Date Received: 09/06/18 09:00

## Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.088		0.018	0.0073	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorobutanoic acid (PFBA)	0.014	J	0.018	0.0087	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorodecane sulfonate (PFDS)	0.0082	U	0.018	0.0082	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorodecanoic acid (PFDA)	0.0070	U	0.018	0.0070	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluoroheptanoic acid (PFHpA)	0.012	J	0.027	0.012	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorohexane Sulfonate (PFHxS)	0.0062	U	0.027	0.0062	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorohexanoic acid (PFHxA)	0.027		0.018	0.0026	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorooctanoic acid (PFOA)	0.025		0.018	0.0087	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorooctane Sulfonate (PFOS)	0.044		0.027	0.012	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluoropentanoic acid (PFPA)	0.053		0.027	0.0097	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorotridecanoic Acid (PFTriA)	0.016	U	0.036	0.016	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluoroundecanoic acid (PFUnA)	0.0061	U	0.018	0.0061	ug/L		09/08/18 14:10	09/10/18 23:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	87		60 - 155	09/08/18 14:10	09/10/18 23:21	1
13C8 PFOS	100		45 - 130	09/08/18 14:10	09/10/18 23:21	1



## ANALYTICAL REPORT

Job Number: 280-114022-1

Job Description: ADEM PFC Sampling - Coosa Valley

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release.  
Stephanie K Rothmeyer  
Project Manager I  
9/12/2018 11:44 AM

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Stephanie K Rothmeyer, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0182  
stephanie.rothmeyer@testamericainc.com  
09/12/2018

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-114022-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Coosa Valley**

**Report Number: 280-114022-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The sample was received on 9/6/2018 at 9:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.6° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample COOSA VALLEY WTP-FINISHED (280-114022-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 09/08/2018 and analyzed on 09/10/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: COOSA VALLEY WTP-FINISHED (280-114022-1), (LCS 280-428995/2-A), (LCSD 280-428995/3-A), (MB 280-428995/1-A). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-114022-1

**Client Sample ID: COOSA VALLEY WTP-FINISHED**

**Lab Sample ID: 280-114022-1**

Date Collected: 09/04/18 11:30

Matrix: Water

Date Received: 09/06/18 09:00

**Method: DV-LC-0012 - Fluorinated Alkyl Substances**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.088		0.018	0.0073	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorobutanoic acid (PFBA)	0.014	J	0.018	0.0087	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorodecane sulfonate (PFDS)	0.0082	U	0.018	0.0082	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorodecanoic acid (PFDA)	0.0070	U	0.018	0.0070	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluoroheptanoic acid (PFHpA)	0.012	J	0.027	0.012	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorohexane Sulfonate (PFHxS)	0.0062	U	0.027	0.0062	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorohexanoic acid (PFHxA)	0.027		0.018	0.0026	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorooctanoic acid (PFOA)	0.025		0.018	0.0087	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorooctane Sulfonate (PFOS)	0.044		0.027	0.012	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluoropentanoic acid (PFPA)	0.053		0.027	0.0097	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluorotridecanoic Acid (PFTriA)	0.016	U	0.036	0.016	ug/L		09/08/18 14:10	09/10/18 23:21	1
Perfluoroundecanoic acid (PFUnA)	0.0061	U	0.018	0.0061	ug/L		09/08/18 14:10	09/10/18 23:21	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	87		60 - 155				09/08/18 14:10	09/10/18 23:21	1
13C8 PFOS	100		45 - 130				09/08/18 14:10	09/10/18 23:21	1



## ANALYTICAL REPORT

Job Number: 280-101712-1

Job Description: ADEM PFC Sampling - Coosa Valley

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603  
Attention: Mr. Ed Poolos



Approved for release.  
Stephanie K Rothmeyer  
Project Manager I  
10/12/2017 10:36 AM

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Stephanie K Rothmeyer, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
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stephanie.rothmeyer@testamericainc.com  
10/12/2017

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-101712-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.
A	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling - Coosa Valley

Report Number: 280-101712-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The sample was received on 9/28/2017 at 8:40 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° C.

No analyses were requested on the COC for the following sample: COOSA VALLEY WTP-FINISHED (280-101712-1). Per volume received, the sample was logged for PFC analysis. The client was notified on 9/29/17.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample COOSA VALLEY WTP-FINISHED (280-101712-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/02/2017 and analyzed on 10/06/2017.

Perfluorobutane Sulfonate (PFBS), Perfluorohexanoic acid (PFHxA) and Perfluorooctane Sulfonate (PFOS) were detected in method blank MB 280-389648/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

The detection limit check (DLCK) failed high for Perfluorotetradecanoic acid (PFTeA). The samples were all non-detect for this analyte; therefore, the data are reported.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: COOSA VALLEY WTP-FINISHED (280-101712-1), (ICB 280-390299/12). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

The internal standard 13C2 PFDoA (IS) failed high in the CCVs associated with batch 280-390299. The target analyte was in control.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-101712-1

Client Sample ID: COOSA VALLEY WTP-FINISHED

Lab Sample ID: 280-101712-1

Date Collected: 09/27/17 12:20

Matrix: Water

Date Received: 09/28/17 08:40

### Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.064	B	0.023	0.0014	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorobutanoic acid (PFBA)	0.017	J	0.023	0.0023	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorodecane sulfonate (PFDS)	0.0015	U	0.023	0.0015	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorodecanoic acid (PFDA)	0.0064	J	0.023	0.00077	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorododecanoic acid (PFDoA)	0.00098	U	0.034	0.00098	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluoroheptanoic acid (PFHpA)	0.011	J	0.034	0.0010	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorohexane Sulfonate (PFHxS)	0.0064	J	0.034	0.0021	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorohexanoic acid (PFHxA)	0.030	B	0.023	0.0011	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorononanoic acid (PFNA)	0.0060	J	0.045	0.0011	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorooctanoic acid (PFOA)	0.023		0.023	0.0010	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorooctane Sulfonate (PFOS)	0.042	B	0.034	0.0013	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluoropentanoic acid (PFPA)	0.046		0.034	0.00077	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorotetradecanoic acid (PFTeA)	0.0012	U ^	0.034	0.0012	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluorotridecanoic Acid (PFTriA)	0.00099	U	0.045	0.00099	ug/L		10/02/17 10:14	10/06/17 03:11	1
Perfluoroundecanoic acid (PFUnA)	0.00090	U	0.023	0.00090	ug/L		10/02/17 10:14	10/06/17 03:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	117		60 - 155	10/02/17 10:14	10/06/17 03:11	1
13C8 PFOS	114		45 - 130	10/02/17 10:14	10/06/17 03:11	1



## ANALYTICAL REPORT

Job Number: 280-115044-1

Job Description: ADEM PFC Sampling - Coosa Valley

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
DiLea R Bindel  
Project Manager I  
10/12/2018 2:03 PM

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DiLea R Bindel, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0173  
dilea.bindel@testamericainc.com  
10/12/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-115044-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Coosa Valley**

**Report Number: 280-115044-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The sample was received on 10/3/2018 9:15 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Sample Coosa Valley - Finished (280-115044-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/05/2018 and analyzed on 10/08/2018.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-115044-1

**Client Sample ID: Coosa Valley - Finished**

**Lab Sample ID: 280-115044-1**

Date Collected: 10/02/18 10:20

Matrix: Water

Date Received: 10/03/18 09:15

Method: DV-LC-0012 - Fluorinated Alkyl Substances									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.017		0.017	0.0085	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorodecanoic acid (PFDA)	0.0068	U	0.017	0.0068	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.026	0.013	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluoroheptanoic acid (PFHpA)	0.013	J	0.026	0.011	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorohexanoic acid (PFHxA)	0.031		0.017	0.0025	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorononanoic acid (PFNA)	0.015	U	0.035	0.015	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorooctanoic acid (PFOA)	0.025		0.017	0.0085	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorooctane sulfonate (PFOS)	0.043		0.026	0.012	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluoropentanoic acid (PFPA)	0.052		0.026	0.0095	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.026	0.013	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.035	0.015	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluoroundecanoic acid (PFUnA)	0.0060	U	0.017	0.0060	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorobutanesulfonic acid (PFBS)	0.11		0.017	0.0072	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorodecanesulfonic acid (PFDS)	0.0080	U	0.017	0.0080	ug/L		10/05/18 18:59	10/08/18 16:17	1
Perfluorohexanesulfonic acid (PFHxS)	0.0061	U	0.026	0.0061	ug/L		10/05/18 18:59	10/08/18 16:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	89		60 - 155				10/05/18 18:59	10/08/18 16:17	1
13C8 PFOS	102		45 - 130				10/05/18 18:59	10/08/18 16:17	1



## ANALYTICAL REPORT

Job Number: 280-88941-4

Job Description: ADEM PFC Sampling Water - Coosa Valley

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603  
Attention: Mr. Ed Poolos



Approved for release:  
Stephanie K Rothmeyer  
Project Manager I  
10/17/2016 3:06 PM

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Stephanie K Rothmeyer, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0182  
stephanie.rothmeyer@testamericainc.com  
10/17/2016

The test results in this report relate only to the samples in this report and meet all requirements of NELAP, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling Water - Coosa Valley

TestAmerica Job ID: 280-88941-4

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling Water - Coosa Valley**

**Report Number: 280-88941-4**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 9/29/2016 at 7:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.8° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample COOSA VALLEY-FINISHED (280-88941-6) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/11/2016 and analyzed on 10/13/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PERFLUOROOCTANE SULFONAMIDE (FOSA)**

Sample COOSA VALLEY-FINISHED (280-88941-6) was analyzed for Perfluorooctane Sulfonamide (FOSA) in accordance with SOP DV-LC-0012. The samples were prepared on 10/10/2016 and analyzed on 10/12/2016.

The Internal Standard 13C8 FOSA (IS) failed low in batch 345862 in the Method Blank and/or low in the LCS in batch 346074. The LCS was in control for the target analyte, FOSA. Some samples also failed low for IS, but were non-detect. A low internal standard recovery would result in a biased high result for the target analyte. Since sample was non-detect they are reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling Water - Coosa Valley

TestAmerica Job ID: 280-88941-4

**Client Sample ID: COOSA VALLEY-FINISHED**

**Lab Sample ID: 280-88941-6**

Date Collected: 09/28/16 15:05

Matrix: Water

Date Received: 09/29/16 07:05

**Method: DV-LC-0012 - Perfluorinated Hydrocarbons**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.061		0.019	0.0078	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorobutanoic acid (PFBA)	0.016	J	0.019	0.0093	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorodecane sulfonate (PFDS)	0.0087	U	0.019	0.0087	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorodecanoic acid (PFDA)	0.0074	U	0.019	0.0074	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.028	0.014	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluoroheptanoic acid (PFHpA)	0.014	J	0.028	0.013	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorohexane Sulfonate (PFHxS)	0.0066	U	0.028	0.0066	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorohexanoic acid (PFHxA)	0.039		0.019	0.0028	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorononanoic acid (PFNA)	0.016	U	0.038	0.016	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorooctanoic acid (PFOA)	0.025		0.019	0.0093	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorooctane Sulfonate (PFOS)	0.035		0.028	0.013	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluoropentanoic acid (PFPA)	0.049		0.028	0.010	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorotetradecanoic acid (PFTeA)	0.014	U	0.028	0.014	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluorotridecanoic Acid (PFTriA)	0.017	U	0.038	0.017	ug/L		10/11/16 18:47	10/13/16 00:48	1
Perfluoroundecanoic acid (PFUnA)	0.0065	U	0.019	0.0065	ug/L		10/11/16 18:47	10/13/16 00:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	109		60 - 155	10/11/16 18:47	10/13/16 00:48	1
13C8 PFOS	94		45 - 130	10/11/16 18:47	10/13/16 00:48	1

**Method: PFC -FOSA - FOSA in Water (LC/MS/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	0.0054	U	0.047	0.0054	ug/L		10/10/16 19:00	10/12/16 18:51	1



## ANALYTICAL REPORT

Job Number: 280-89560-1

Job Description: ADEM PFC Sampling Water - CV

For:

Alabama Dept. Environmental Management

2715 Sandlin Road, SW

Decatur, AL 35603

Attention: Mr. Ed Poolos



Approved for release.  
Stephanie K Rothmeyer  
Project Manager I  
10/25/2016 4:21 PM

Stephanie K Rothmeyer, Project Manager I

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(303)736-0182

stephanie.rothmeyer@testamericainc.com

10/25/2016

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling Water - CV

TestAmerica Job ID: 280-89560-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling Water - CV

Report Number: 280-89560-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 10/13/2016 at 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Samples CV-RIVER (280-89560-1) and CV-QUARRY (280-89560-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/19/2016 and analyzed on 10/20/2016.

Internal standard responses were outside of acceptance limits for the following samples: CV-RIVER (280-89560-1), CV-QUARRY (280-89560-2). The samples show evidence of matrix interference. Several internal standards failed in the samples due to matrix.

During the solid phase extraction process, the following sample clogged the cartridge: CV-RIVER (280-89560-1). Therefore, the IS volume was adjusted to match the volume of sample extracted. As such, reporting limits (RLs) are not impacted.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### PERFLUOROOCTANE SULFONAMIDE (FOSA)

Samples CV-RIVER (280-89560-1) and CV-QUARRY (280-89560-2) were analyzed for Perfluorooctane Sulfonamide (FOSA) in accordance with SOP DV-LC-0012. The samples were prepared on 10/20/2016 and analyzed on 10/21/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling Water - CV

TestAmerica Job ID: 280-89560-1

**Client Sample ID: CV-RIVER**

**Lab Sample ID: 280-89560-1**

Date Collected: 10/12/16 13:35

Matrix: Water

Date Received: 10/13/16 10:00

**Method: DV-LC-0012 - Perfluorinated Hydrocarbons**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.060		0.034	0.014	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorobutanoic acid (PFBA)	0.021	J	0.034	0.017	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorodecane sulfonate (PFDS)	0.016	U	0.034	0.016	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorodecanoic acid (PFDA)	0.013	U	0.034	0.013	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorododecanoic acid (PFDoA)	0.025	U	0.051	0.025	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluoroheptanoic acid (PFHpA)	0.022	U	0.051	0.022	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorohexane Sulfonate (PFHxS)	0.012	U	0.051	0.012	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorohexanoic acid (PFHxA)	0.048		0.034	0.0049	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorononanoic acid (PFNA)	0.029	U	0.068	0.029	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorooctanoic acid (PFOA)	0.027	J	0.034	0.017	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorooctane Sulfonate (PFOS)	0.041	J	0.051	0.023	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluoropentanoic acid (PFPA)	0.065		0.051	0.018	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorotetradecanoic acid (PFTeA)	0.025	U	0.051	0.025	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluorotridecanoic Acid (PFTriA)	0.030	U	0.068	0.030	ug/L		10/19/16 18:30	10/20/16 17:47	1
Perfluoroundecanoic acid (PFUnA)	0.012	U	0.034	0.012	ug/L		10/19/16 18:30	10/20/16 17:47	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	107		60 - 155				10/19/16 18:30	10/20/16 17:47	1
13C8 PFOS	97		45 - 130				10/19/16 18:30	10/20/16 17:47	1

**Method: PFC -FOSA - FOSA in Water (LC/MS/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	0.0052	U	0.045	0.0052	ug/L		10/20/16 17:30	10/21/16 16:25	1

**Client Sample ID: CV-QUARRY**

**Lab Sample ID: 280-89560-2**

Date Collected: 10/12/16 13:25

Matrix: Water

Date Received: 10/13/16 10:00

**Method: DV-LC-0012 - Perfluorinated Hydrocarbons**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.066		0.018	0.0075	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorobutanoic acid (PFBA)	0.021		0.018	0.0089	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorodecane sulfonate (PFDS)	0.0083	U	0.018	0.0083	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorodecanoic acid (PFDA)	0.0071	U	0.018	0.0071	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.027	0.014	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluoroheptanoic acid (PFHpA)	0.012	U	0.027	0.012	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorohexane Sulfonate (PFHxS)	0.0063	U	0.027	0.0063	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorohexanoic acid (PFHxA)	0.036		0.018	0.0026	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorooctanoic acid (PFOA)	0.022		0.018	0.0089	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorooctane Sulfonate (PFOS)	0.039		0.027	0.012	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluoropentanoic acid (PFPA)	0.052		0.027	0.0099	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluorotridecanoic Acid (PFTriA)	0.016	U	0.036	0.016	ug/L		10/19/16 18:30	10/20/16 17:59	1
Perfluoroundecanoic acid (PFUnA)	0.0063	U	0.018	0.0063	ug/L		10/19/16 18:30	10/20/16 17:59	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	108		60 - 155				10/19/16 18:30	10/20/16 17:59	1
13C8 PFOS	98		45 - 130				10/19/16 18:30	10/20/16 17:59	1

TestAmerica Denver



## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling Water - CV

TestAmerica Job ID: 280-89560-1

**Client Sample ID: CV-QUARRY**

**Lab Sample ID: 280-89560-2**

Date Collected: 10/12/16 13:25

Matrix: Water

Date Received: 10/13/16 10:00

Method: PFC -FOSA - FOSA in Water (LC/MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	0.0051	U	0.045	0.0051	ug/L	--	10/20/16 17:30	10/21/16 16:37	1

TestAmerica Denver



## ANALYTICAL REPORT

Job Number: 280-92490-3

Job Description: ADEM PFC Sampling - Coosa Valley

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Ed Poolos



Approved for release:  
Stephanie K Rothmeyer  
Project Manager I  
12/31/2016 1:10 PM

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Stephanie K Rothmeyer, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0182  
stephanie.rothmeyer@testamericainc.com  
12/31/2016

The test results in this report relate only to the samples in this report and meet all requirements of NELAP, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-92490-3

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Coosa Valley**

**Report Number: 280-92490-3**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 12/22/2016 at 10:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.0°C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample COOSA VALLEY-FINISHED (280-92490-4) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 12/27/2016 and analyzed on 12/28/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PERFLUOROOCTANE SULFONAMIDE (FOSA)**

Sample COOSA VALLEY-FINISHED (280-92490-4) was analyzed for Perfluorooctane Sulfonamide (FOSA) in accordance with SOP DV-LC-0012. The samples were prepared on 12/28/2016 and analyzed on 12/29/2016.

Internal standard responses were outside of acceptance limits for the following sample: COOSA VALLEY-FINISHED (280-92490-4). The sample shows evidence of matrix interference. 13C4 FOSA failed in the samples, but was in control in the Method Blank, LCS and LCSD, indicating matrix is the cause.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-92490-3

**Client Sample ID: COOSA VALLEY-FINISHED**

**Lab Sample ID: 280-92490-4**

Date Collected: 12/20/16 12:15

Matrix: Water

Date Received: 12/22/16 10:35

### Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.049		0.019	0.0077	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorobutanoic acid (PFBA)	0.013	J	0.019	0.0092	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorodecane sulfonate (PFDS)	0.0086	U	0.019	0.0086	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorodecanoic acid (PFDA)	0.0073	U	0.019	0.0073	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.028	0.014	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluoroheptanoic acid (PFHpA)	0.012	U	0.028	0.012	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorohexane Sulfonate (PFHxS)	0.0065	U	0.028	0.0065	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorohexanoic acid (PFHxA)	0.041		0.019	0.0027	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorononanoic acid (PFNA)	0.016	U	0.037	0.016	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorooctanoic acid (PFOA)	0.020		0.019	0.0092	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorooctane Sulfonate (PFOS)	0.019	J	0.028	0.012	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluoropentanoic acid (PFPA)	0.051		0.028	0.010	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorotetradecanoic acid (PFTeA)	0.014	U	0.028	0.014	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluorotridecanoic Acid (PFTriA)	0.017	U	0.037	0.017	ug/L		12/27/16 10:22	12/28/16 21:16	1
Perfluoroundecanoic acid (PFUnA)	0.0064	U	0.019	0.0064	ug/L		12/27/16 10:22	12/28/16 21:16	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	105		60 - 155				12/27/16 10:22	12/28/16 21:16	1
13C8 PFOS	104		45 - 130				12/27/16 10:22	12/28/16 21:16	1

### Method: PFC -FOSA - FOSA in Water (LC/MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	0.0051	U	0.045	0.0051	ug/L		12/28/16 09:49	12/29/16 17:51	1

## ANALYTICAL REPORT

Job Number: 280-95151-1

Job Description: ADEM PFC Sampling

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603  
Attention: Mr. Ed Poolos



Approved for release.  
Stephanie K Rothmeyer  
Project Manager I  
4/7/2017 9:17 AM

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Stephanie K Rothmeyer, Project Manager I  
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(303)736-0182  
stephanie.rothmeyer@testamericainc.com  
04/07/2017

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling

TestAmerica Job ID: 280-95151-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling

Report Number: 280-95151-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 3/24/2017 at 10:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.3° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample COOSA VALLEY (280-95151-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 03/29/2017 and analyzed on 03/30/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PERFLUOROOCTANE SULFONAMIDE (FOSA)**

Sample COOSA VALLEY (280-95151-1) was analyzed for Perfluorooctane Sulfonamide (FOSA) in accordance with SOP DV-LC-0012. The samples were prepared on 04/02/2017 and analyzed on 04/05/2017.

Internal standard responses were outside of acceptance limits for the following sample: COOSA VALLEY (280-95151-1). The sample shows evidence of matrix interference.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling

TestAmerica Job ID: 280-95151-1

**Client Sample ID: COOSA VALLEY**

**Lab Sample ID: 280-95151-1**

Date Collected: 03/21/17 11:50

Matrix: Water

Date Received: 03/24/17 10:25

### Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.044		0.018	0.0073	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorobutanoic acid (PFBA)	0.014	J	0.018	0.0087	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorodecane sulfonate (PFDS)	0.0081	U	0.018	0.0081	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorodecanoic acid (PFDA)	0.0070	U	0.018	0.0070	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluoroheptanoic acid (PFHpA)	0.012	J	0.027	0.012	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorohexane Sulfonate (PFHxS)	0.0062	U	0.027	0.0062	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorohexanoic acid (PFHxA)	0.034		0.018	0.0026	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorononanoic acid (PFNA)	0.015	U	0.036	0.015	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorooctanoic acid (PFOA)	0.017	J	0.018	0.0087	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorooctane Sulfonate (PFOS)	0.018	J	0.027	0.012	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluoropentanoic acid (PFPA)	0.037		0.027	0.0097	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluorotridecanoic Acid (PFTriA)	0.016	U	0.036	0.016	ug/L		03/29/17 13:45	03/30/17 17:07	1
Perfluoroundecanoic acid (PFUnA)	0.0061	U	0.018	0.0061	ug/L		03/29/17 13:45	03/30/17 17:07	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	110		60 - 155	03/29/17 13:45	03/30/17 17:07	1
13C8 PFOS	104		45 - 130	03/29/17 13:45	03/30/17 17:07	1

### Method: PFC -FOSA - FOSA in Water (LC/MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	0.0056	U	0.049	0.0056	ug/L		04/02/17 11:21	04/05/17 23:44	1

## ANALYTICAL REPORT

Job Number: 280-98809-3

Job Description: ADEM PFC Sampling - Coosa Valley

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603  
Attention: Mr. Ed Poolos



Approved for release.  
Stephanie K Rothmeyer  
Project Manager I  
7/21/2017 2:51 PM

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Stephanie K Rothmeyer, Project Manager I  
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(303)736-0182  
stephanie.rothmeyer@testamericainc.com  
07/21/2017

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-98809-3

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## **CASE NARRATIVE**

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Coosa Valley**

**Report Number: 280-98809-3**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 6/29/2017 at 8:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.5° C and 1.7° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample COOSA VALLEY-FINISHED (280-98809-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 07/05/2017 and analyzed on 07/14/2017.

Internal standard responses were outside of acceptance limits for the following sample: COOSA VALLEY-FINISHED (280-98809-1). The sample shows evidence of matrix interference.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Coosa Valley

TestAmerica Job ID: 280-98809-3

**Client Sample ID: COOSA VALLEY-FINISHED**

**Lab Sample ID: 280-98809-1**

Date Collected: 06/27/17 13:00

Matrix: Water

Date Received: 06/29/17 08:40

**Method: DV-LC-0012 - Perfluorinated Hydrocarbons**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.054		0.019	0.0078	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorobutanoic acid (PFBA)	0.015	J	0.019	0.0092	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorodecane sulfonate (PFDS)	0.0086	U	0.019	0.0086	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorodecanoic acid (PFDA)	0.0074	U	0.019	0.0074	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.028	0.014	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluoroheptanoic acid (PFHpA)	0.012	J	0.028	0.012	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorohexane Sulfonate (PFHxS)	0.0066	U	0.028	0.0066	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorohexanoic acid (PFHxA)	0.025		0.019	0.0027	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorononanoic acid (PFNA)	0.016	U	0.038	0.016	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorooctanoic acid (PFOA)	0.023		0.019	0.0092	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorooctane Sulfonate (PFOS)	0.043		0.028	0.013	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluoropentanoic acid (PFPA)	0.027	J	0.028	0.010	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorotetradecanoic acid (PFTeA)	0.014	U	0.028	0.014	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluorotridecanoic Acid (PFTriA)	0.017	U	0.038	0.017	ug/L		07/05/17 09:57	07/14/17 17:18	1
Perfluoroundecanoic acid (PFUnA)	0.0065	U	0.019	0.0065	ug/L		07/05/17 09:57	07/14/17 17:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	103		60 - 155	07/05/17 09:57	07/14/17 17:18	1
13C8 PFOS	97		45 - 130	07/05/17 09:57	07/14/17 17:18	1

## ANALYTICAL REPORT

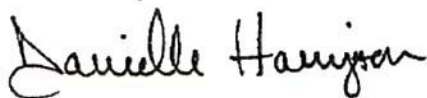
Job Number: 280-114789-1

Job Description: ADEM PFC Sampling - Centre

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release.  
Danielle M Harrington  
Project Manager II  
10/5/2018 6:47 AM

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Designee for  
DiLea R Bindel, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0173  
dilea.bindel@testamericainc.com  
10/05/2018

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

TestAmerica Laboratories, Inc.

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-114789-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Centre**

**Report Number: 280-114789-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 09/26/2018; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.8 C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Samples CENTRE-RAW (280-114789-1) and CENTRE-FINISHED (280-114789-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 09/27/2018 and analyzed on 09/28/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: CENTRE-RAW (280-114789-1) and CENTRE-FINISHED (280-114789-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

The opening continuing calibration verification (CCV) was high for 13C8 PFOS. The samples were in control and the closing CCV was in control, therefore, corrective action is deemed unnecessary.

Perfluorohexanoic acid (PFHxA) was detected in method blank MB 280-431186/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-114789-1

Client Sample ID: CENTRE-RAW

Lab Sample ID: 280-114789-1

Date Collected: 09/24/18 11:00

Matrix: Water

Date Received: 09/26/18 09:15

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.017		0.017	0.0083	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorodecanoic acid (PFDA)	0.0066	U	0.017	0.0066	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.025	0.013	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluoroheptanoic acid (PFHpA)	0.011	U	0.025	0.011	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorohexanoic acid (PFHxA)	0.025	B	0.017	0.0025	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorononanoic acid (PFNA)	0.015	U	0.034	0.015	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorooctanoic acid (PFOA)	0.022		0.017	0.0083	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorooctane Sulfonate (PFOS)	0.045		0.025	0.011	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluoropentanoic acid (PFPA)	0.046		0.025	0.0092	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.025	0.012	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorotridecanoic Acid (PFTriA)	0.015	U	0.034	0.015	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluoroundecanoic acid (PFUnA)	0.0058	U	0.017	0.0058	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorobutanesulfonic acid (PFBS)	0.12		0.017	0.0070	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorodecanesulfonic acid (PFDS)	0.0078	U	0.017	0.0078	ug/L		09/27/18 08:52	09/28/18 23:42	1
Perfluorohexanesulfonic acid (PFHxS)	0.0059	U	0.025	0.0059	ug/L		09/27/18 08:52	09/28/18 23:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	88		60 - 155				09/27/18 08:52	09/28/18 23:42	1
13C8 PFOS	101		45 - 130				09/27/18 08:52	09/28/18 23:42	1

Client Sample ID: CENTRE-FINISHED

Lab Sample ID: 280-114789-2

Date Collected: 09/25/18 12:55

Matrix: Water

Date Received: 09/26/18 09:15

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.021		0.017	0.0086	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorodecanoic acid (PFDA)	0.0068	U	0.017	0.0068	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.026	0.013	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluoroheptanoic acid (PFHpA)	0.015	J	0.026	0.012	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorohexanoic acid (PFHxA)	0.035	B	0.017	0.0025	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorononanoic acid (PFNA)	0.015	U	0.035	0.015	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorooctanoic acid (PFOA)	0.032		0.017	0.0086	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorooctane Sulfonate (PFOS)	0.041		0.026	0.012	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluoropentanoic acid (PFPA)	0.068		0.026	0.0095	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.026	0.013	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorotridecanoic Acid (PFTriA)	0.015	U	0.035	0.015	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluoroundecanoic acid (PFUnA)	0.0060	U	0.017	0.0060	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorobutanesulfonic acid (PFBS)	0.11		0.017	0.0072	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorodecanesulfonic acid (PFDS)	0.0080	U	0.017	0.0080	ug/L		09/27/18 08:52	09/28/18 23:55	1
Perfluorohexanesulfonic acid (PFHxS)	0.0061	U	0.026	0.0061	ug/L		09/27/18 08:52	09/28/18 23:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	86		60 - 155				09/27/18 08:52	09/28/18 23:55	1
13C8 PFOS	98		45 - 130				09/27/18 08:52	09/28/18 23:55	1

TestAmerica Denver

## ANALYTICAL REPORT

Job Number: 280-115650-1

Job Description: ADEM PFC Sampling - Centre

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release  
DiLea R Bindel  
Project Manager I  
11/5/2018 7:33 AM

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DiLea R Bindel, Project Manager I  
4955 Yarrow Street, Arvada, CO, 80002  
(303)736-0173  
dilea.bindel@testamericainc.com  
11/05/2018

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-115650-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Centre**

**Report Number: 280-115650-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The sample was received on 10/17/2018 9:40 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample CENTRE-FINISHED (280-115650-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/18/2018 and analyzed on 10/31/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: CENTRE-FINISHED (280-115650-1). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-115650-1

**Client Sample ID: CENTRE-FINISHED**

**Lab Sample ID: 280-115650-1**

Date Collected: 10/16/18 12:55

Matrix: Water

Date Received: 10/17/18 09:40

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.035		0.018	0.0088	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorodecanoic acid (PFDA)	0.0075	J	0.018	0.0070	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluoroheptanoic acid (PFHpA)	0.020	J	0.027	0.012	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorohexanoic acid (PFHxA)	0.055		0.018	0.0026	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorooctanoic acid (PFOA)	0.044		0.018	0.0088	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorooctane sulfonate (PFOS)	0.075		0.027	0.012	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluoropentanoic acid (PFPA)	0.087		0.027	0.0098	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.036	0.016	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluoroundecanoic acid (PFUnA)	0.0062	U	0.018	0.0062	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorobutanesulfonic acid (PFBS)	0.22		0.018	0.0074	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorodecanesulfonic acid (PFDS)	0.0082	U	0.018	0.0082	ug/L		10/18/18 17:27	10/31/18 22:23	1
Perfluorohexanesulfonic acid (PFHxS)	0.0063	U	0.027	0.0063	ug/L		10/18/18 17:27	10/31/18 22:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	104		60 - 155				10/18/18 17:27	10/31/18 22:23	1
13C8 PFOS	102		45 - 130				10/18/18 17:27	10/31/18 22:23	1

## ANALYTICAL REPORT

Job Number: 280-115503-1

Job Description: ADEM PFC Sampling - Centre

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
DiLea R Bindel  
Project Manager I  
11/5/2018 7:29 AM

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11/05/2018

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-115503-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling - Centre

Report Number: 280-115503-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 10/12/2018 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.6° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Samples CENTRE-RAW (280-115503-1) and CENTRE-FINISHED (280-115503-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/20/2018 and analyzed on 11/01/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: CENTRE-RAW (280-115503-1). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-115503-1

**Client Sample ID: CENTRE-RAW**

**Lab Sample ID: 280-115503-1**

Date Collected: 10/11/18 09:00

Matrix: Water

Date Received: 10/12/18 10:15

**Method: DV-LC-0012 - Fluorinated Alkyl Substances**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.034		0.017	0.0082	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorodecanoic acid (PFDA)	0.0084	J	0.017	0.0065	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorododecanoic acid (PFDoA)	0.012	U	0.025	0.012	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluoroheptanoic acid (PFHpA)	0.022	J	0.025	0.011	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorohexanoic acid (PFHxA)	0.060		0.017	0.0024	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorononanoic acid (PFNA)	0.014	U	0.033	0.014	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorooctanoic acid (PFOA)	0.043		0.017	0.0082	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorooctane sulfonate (PFOS)	0.094		0.025	0.011	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluoropentanoic acid (PFPA)	0.097		0.025	0.0091	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.025	0.012	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.033	0.015	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluoroundecanoic acid (PFUnA)	0.0057	U	0.017	0.0057	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorobutanesulfonic acid (PFBS)	0.26		0.017	0.0069	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorodecanesulfonic acid (PFDS)	0.0076	U	0.017	0.0076	ug/L		10/20/18 14:28	11/01/18 00:14	1
Perfluorohexanesulfonic acid (PFHxS)	0.0069	J	0.025	0.0058	ug/L		10/20/18 14:28	11/01/18 00:14	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	102		60 - 155				10/20/18 14:28	11/01/18 00:14	1
13C8 PFOS	103		45 - 130				10/20/18 14:28	11/01/18 00:14	1

**Client Sample ID: CENTRE-FINISHED**

**Lab Sample ID: 280-115503-2**

Date Collected: 10/11/18 13:25

Matrix: Water

Date Received: 10/12/18 10:15

**Method: DV-LC-0012 - Fluorinated Alkyl Substances**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.038		0.018	0.0087	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorodecanoic acid (PFDA)	0.0070	U	0.018	0.0070	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluoroheptanoic acid (PFHpA)	0.018	J	0.027	0.012	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorohexanoic acid (PFHxA)	0.058		0.018	0.0026	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorononanoic acid (PFNA)	0.015	U	0.036	0.015	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorooctanoic acid (PFOA)	0.037		0.018	0.0087	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorooctane sulfonate (PFOS)	0.070		0.027	0.012	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluoropentanoic acid (PFPA)	0.095		0.027	0.0097	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.036	0.016	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluoroundecanoic acid (PFUnA)	0.0061	U	0.018	0.0061	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorobutanesulfonic acid (PFBS)	0.23		0.018	0.0073	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorodecanesulfonic acid (PFDS)	0.0081	U	0.018	0.0081	ug/L		10/20/18 14:28	11/01/18 00:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.0063	J	0.027	0.0062	ug/L		10/20/18 14:28	11/01/18 00:26	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	97		60 - 155				10/20/18 14:28	11/01/18 00:26	1
13C8 PFOS	101		45 - 130				10/20/18 14:28	11/01/18 00:26	1

TestAmerica Denver

## ANALYTICAL REPORT

Job Number: 280-115993-1

Job Description: ADEM PFC Sampling - Centre

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release  
DiLea R Bindel  
Project Manager I  
11/5/2018 7:35 AM

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DiLea R Bindel, Project Manager I  
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11/05/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-115993-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Centre**

**Report Number: 280-115993-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 10/24/2018 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.6° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Samples Centre-Raw (280-115993-1) and Centre-Finished (280-115993-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/26/2018 and analyzed on 10/31/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: Centre-Raw (280-115993-1). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-115993-1

Client Sample ID: Centre-Raw

Date Collected: 10/22/18 08:45

Date Received: 10/24/18 09:45

Lab Sample ID: 280-115993-1

Matrix: Water

## Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.037		0.017	0.0085	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorodecanoic acid (PFDA)	0.013	J	0.017	0.0068	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.026	0.013	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluoroheptanoic acid (PFHpA)	0.023	J	0.026	0.011	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorohexanoic acid (PFHxA)	0.059		0.017	0.0025	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorononanoic acid (PFNA)	0.015	U	0.035	0.015	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorooctanoic acid (PFOA)	0.052		0.017	0.0085	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorooctane sulfonate (PFOS)	0.13		0.026	0.012	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluoropentanoic acid (PFPA)	0.085		0.026	0.0095	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.026	0.013	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.035	0.015	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluoroundecanoic acid (PFUnA)	0.0060	U	0.017	0.0060	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorobutanesulfonic acid (PFBS)	0.30		0.017	0.0072	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorodecanesulfonic acid (PFDS)	0.0080	U	0.017	0.0080	ug/L		10/26/18 17:16	10/31/18 17:53	1
Perfluorohexanesulfonic acid (PFHxS)	0.0080	J	0.026	0.0061	ug/L		10/26/18 17:16	10/31/18 17:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		60 - 155				10/26/18 17:16	10/31/18 17:53	1
13C8 PFOS	101		45 - 130				10/26/18 17:16	10/31/18 17:53	1

Client Sample ID: Centre-Finished

Date Collected: 10/23/18 13:10

Date Received: 10/24/18 09:45

Lab Sample ID: 280-115993-2

Matrix: Water

## Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.038		0.018	0.0090	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorodecanoic acid (PFDA)	0.0072	U	0.018	0.0072	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.028	0.014	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluoroheptanoic acid (PFHpA)	0.020	J	0.028	0.012	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorohexanoic acid (PFHxA)	0.051		0.018	0.0027	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorononanoic acid (PFNA)	0.016	U	0.037	0.016	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorooctanoic acid (PFOA)	0.045		0.018	0.0090	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorooctane sulfonate (PFOS)	0.073		0.028	0.012	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluoropentanoic acid (PFPA)	0.082		0.028	0.010	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.028	0.013	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.037	0.016	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluoroundecanoic acid (PFUnA)	0.0063	U	0.018	0.0063	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorobutanesulfonic acid (PFBS)	0.24		0.018	0.0076	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorodecanesulfonic acid (PFDS)	0.0084	U	0.018	0.0084	ug/L		10/26/18 17:16	10/31/18 18:05	1
Perfluorohexanesulfonic acid (PFHxS)	0.0064	U	0.028	0.0064	ug/L		10/26/18 17:16	10/31/18 18:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		60 - 155				10/26/18 17:16	10/31/18 18:05	1
13C8 PFOS	105		45 - 130				10/26/18 17:16	10/31/18 18:05	1

TestAmerica Denver

## ANALYTICAL REPORT

Job Number: 280-115064-1

Job Description: ADEM PFC Sampling - Centre

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
DiLea R Bindel  
Project Manager I  
10/12/2018 4:10 PM

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DiLea R Bindel, Project Manager I  
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(303)736-0173  
dilea.bindel@testamericainc.com  
10/12/2018

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002  
Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-115064-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

**Client: Alabama Dept. Environmental Management**

**Project: ADEM PFC Sampling - Centre**

**Report Number: 280-115064-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The sample was received on 10/3/2018 9:15 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4° C.

### **PERFLUORINATED HYDROCARBONS (PFC)**

Sample Centre - Finished (280-115064-1) was analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 10/05/2018 and analyzed on 10/08/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: Centre - Finished (280-115064-1). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-115064-1

**Client Sample ID: Centre - Finished**

**Lab Sample ID: 280-115064-1**

Date Collected: 10/02/18 12:30

Matrix: Water

Date Received: 10/03/18 09:15

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.025		0.018	0.0088	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorodecanoic acid (PFDA)	0.0070	U	0.018	0.0070	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.027	0.013	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluoroheptanoic acid (PFHpA)	0.016	J	0.027	0.012	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorohexanoic acid (PFHxA)	0.040		0.018	0.0026	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorononanoic acid (PFNA)	0.016	U	0.036	0.016	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorooctanoic acid (PFOA)	0.032		0.018	0.0088	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorooctane sulfonate (PFOS)	0.054		0.027	0.012	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluoropentanoic acid (PFPA)	0.073		0.027	0.0097	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.027	0.013	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.036	0.016	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluoroundecanoic acid (PFUnA)	0.0062	U	0.018	0.0062	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorobutanesulfonic acid (PFBS)	0.18		0.018	0.0074	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorodecanesulfonic acid (PFDS)	0.0082	U	0.018	0.0082	ug/L		10/05/18 18:59	10/08/18 16:54	1
Perfluorohexanesulfonic acid (PFHxS)	0.0062	U	0.027	0.0062	ug/L		10/05/18 18:59	10/08/18 16:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	87		60 - 155				10/05/18 18:59	10/08/18 16:54	1
13C8 PFOS	94		45 - 130				10/05/18 18:59	10/08/18 16:54	1

## ANALYTICAL REPORT

Job Number: 280-116684-1

Job Description: ADEM PFC Sampling - Centre

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release:  
DiLea R Bindel  
Project Manager I  
11/15/2016 3:39 PM

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11/15/2018

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002

Tel (303) 736-0100 Fax (303) 431-7171 [www.testamericainc.com](http://www.testamericainc.com)

## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-116684-1

### Qualifiers

#### LCMS

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling - Centre

Report Number: 280-116684-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 11/7/2018 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Samples CENTRE-RAW (280-116684-1) and CENTRE-FINISHED (280-116684-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 11/10/2018 and analyzed on 11/14/2018.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: CENTRE-RAW (280-116684-1) and CENTRE-FINISHED (280-116684-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Centre

TestAmerica Job ID: 280-116684-1

**Client Sample ID: CENTRE-RAW**

**Lab Sample ID: 280-116684-1**

Date Collected: 11/06/18 08:30

Matrix: Water

Date Received: 11/07/18 09:00

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.038		0.017	0.0081	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorodecanoic acid (PFDA)	0.0073	J	0.017	0.0065	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorododecanoic acid (PFDoA)	0.012	U	0.025	0.012	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluoroheptanoic acid (PFHpA)	0.026		0.025	0.011	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorohexanoic acid (PFHxA)	0.063		0.017	0.0024	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorononanoic acid (PFNA)	0.014	U	0.033	0.014	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorooctanoic acid (PFOA)	0.048		0.017	0.0081	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorooctane sulfonate (PFOS)	0.082		0.025	0.011	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluoropentanoic acid (PFPA)	0.10		0.025	0.0091	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.025	0.012	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.033	0.015	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluoroundecanoic acid (PFUnA)	0.0057	U	0.017	0.0057	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorobutanesulfonic acid (PFBS)	0.33		0.017	0.0068	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorodecanesulfonic acid (PFDS)	0.0076	U	0.017	0.0076	ug/L		11/10/18 13:32	11/14/18 12:22	1
Perfluorohexanesulfonic acid (PFHxS)	0.0072	J	0.025	0.0058	ug/L		11/10/18 13:32	11/14/18 12:22	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		60 - 155				11/10/18 13:32	11/14/18 12:22	1
13C8 PFOS	110		45 - 130				11/10/18 13:32	11/14/18 12:22	1

**Client Sample ID: CENTRE-FINISHED**

**Lab Sample ID: 280-116684-2**

Date Collected: 11/06/18 13:00

Matrix: Water

Date Received: 11/07/18 09:00

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.027		0.018	0.0090	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorodecanoic acid (PFDA)	0.0072	U	0.018	0.0072	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorododecanoic acid (PFDoA)	0.014	U	0.028	0.014	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluoroheptanoic acid (PFHpA)	0.017	J	0.028	0.012	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorohexanoic acid (PFHxA)	0.047		0.018	0.0027	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorononanoic acid (PFNA)	0.016	U	0.037	0.016	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorooctanoic acid (PFOA)	0.035		0.018	0.0090	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorooctane sulfonate (PFOS)	0.065		0.028	0.012	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluoropentanoic acid (PFPA)	0.080		0.028	0.010	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorotetradecanoic acid (PFTeA)	0.014	U	0.028	0.014	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorotridecanoic acid (PFTriA)	0.016	U	0.037	0.016	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluoroundecanoic acid (PFUnA)	0.0064	U	0.018	0.0064	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorobutanesulfonic acid (PFBS)	0.24		0.018	0.0076	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorodecanesulfonic acid (PFDS)	0.0084	U	0.018	0.0084	ug/L		11/10/18 13:32	11/14/18 12:34	1
Perfluorohexanesulfonic acid (PFHxS)	0.0064	U	0.028	0.0064	ug/L		11/10/18 13:32	11/14/18 12:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	103		60 - 155				11/10/18 13:32	11/14/18 12:34	1
13C8 PFOS	108		45 - 130				11/10/18 13:32	11/14/18 12:34	1

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